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During the first year of the program, 27 individual projects enrolling approximately 20,000 first-grade pupils were involved. Fifteen of these projects participated in a second-grade followup study. Some conclusions based on an analysis of data are (1) that prereading knowledge of letter names is the best single predictor of reading achievement in the primary grades, (2) that various measures of reading readiness predict achievement in a similar fashion for many types of reading programs, (3) that girls were generally superior to boys for all three testing periods, (4) that instruction in phonics is related to achievement in word recognition and spelling, (5) that direct instruction in comprehension is essential, (6) that a writing component is an effective addition to a primary reading program, (7) that the prereader should be taught to recognize letters of the alphabet, and (8) that pupils can learn to recognize more words than are commonly introduced in reading programs. The elements of the learning situation attributable to teachers, classrooms, schools, and school systems play a large role over and above the materials and/or approaches used. (RJ)

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Classroom Implications of the First-Grade Reading Studies

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One of the hazards of conducting educational research is that sooner or later someone asks about the study's classroom implications. Today I have been confronted with that very assignment. For the past few years I have been involved with the Cooperative Research Program in First-Grade Reading Instruction. The findings of this ambitious investigation have been reported in two large volumes. (Bond and Dykstra, 1967; Dykstra, 1967). A countless number of analysis of variance tables and correlation matrices have been recorded for posterity. Today I wish to reflect on the most important, as well as the most perplexing, question. This question can best be asked in two simple words -- so what?

Before moving to the "so what" question, however, it would perhaps be helpful to summarize very briefly the research study itself. The Cooperative Research Program in First-Grade Reading Instruction, supported by the United States Office of Education, elicited the cooperation of many of the foremost authorities in the field of reading as well as that of public school personnel, educational publishers, and many other interested persons representing many areas of expertise. Everyone involved in the study, however, had in common a desire to learn as much as possible about various facets of instruction in beginning reading.

During the first year of the program twenty-seven individual projects enrolling approximately 20,000 first-grade pupils were involved. Fifteen of these projects participated in a second-grade follow-up study. Each of the individual studies was a complete study in itself. The unique characteristic of the research venture was that each project director, in addition to carrying out his own analysis, made the data available to the Coordinating Center at the University of Minnesota so that an analysis of instructional methodology could be made across projects. In order for this overall analysis to be conducted each of the participating project directors agreed to abide by common experimental guidelines concerning test administration, length of experimental period, control of "Hawthorne Effect", selection of a sample, and similar crucial experimental variables. Each project director also agreed to use a common set of evaluation instruments for measuring reading readiness and achievement and to collect common information concerning pupil, teacher, school, and community characteristics. Full details of the investigation have been reported elsewhere; my purpose today is to focus on its conclusions and implications.

I would like to preface further my remarks with the caution that the conclusions and/or implications I present are entirely my own interpretation of the research evidence. Your perusal of the data might lead to quite different conclusions. May I urge, therefore, that anyone with a special interest in the findings of

this research endeavor go to the original reports and derive his own independent conclusions.

My discussion of conclusions and implications will cover a number of related areas. The study yielded information pertinent to the following general topics: (1) readiness testing and classroom grouping, (2) sex differences in primary grade achievement, and (3) instructional methodology in initial instruction. My closing remarks will discuss some general recommendations for future research.

Readiness Testing and Classroom Grouping

One of the purposes of the study was to determine the relationship between various reading readiness characteristics and subsequent achievement in beginning reading. A variety of pre-reading tests were administered to measure visual discrimination, auditory discrimination, letter knowledge, intelligence, learning rate, vocabulary, and listening ability. First-grade and second-grade reading ability were measured by group tests of word recognition and paragraph comprehension. Analysis of the data from this phase of the investigation lead to the following conclusions:

1. Prereading knowledge of letter names is the best single predictor of reading achievement in the primary grades. The predictive validity of this single readiness characteristics is of approximately the same magnitude as that of an entire readiness battery. Therefore, in terms of assessing when a child is ready to

read, this single easily-administered test is probably just as useful as a time-consuming battery of readiness tasks.

2. Prediction of reading achievement cannot be done in a precise fashion. Even the best predictor of future achievement (knowledge of letter names) cannot predict very accurately how well any given child will succeed in mastering the skill of reading. Therefore, it is essential that teachers regard any intraclass grouping for instructional purposes to be of a temporary nature. Some pupils for whom prognosis is very bright on the basis of readiness test information simply will not make the progress in learning to read that is expected of them. Other pupils for whom learning to read would seem to be an extremely arduous task make unusually rapid progress. The classroom teacher will have to make movement between and among instructional groups a normal procedure.

3. The various measures of reading readiness predict achievement in a similar fashion for many types of reading programs used in today's schools. There was no evidence in this study that visual discrimination ability is more highly related to achievement in one type of program or that intelligence is more highly related to achievement in another type of program or that any of the other readiness measures are differentially related to achievement in any of the programs studied. This study provides little encouragement to teachers who feel that children with special aptitudes or deficiencies in intelligence, visual discrimination, auditory discrimination, or letter knowledge, will have a better chance of

success in one program rather than another. The evidence indicates that pupils high in any of the traits measured learn to read more easily (on the average) than pupils who score low on these traits and that they achieve at basically the same level regardless of whether they are enrolled in basal programs, language experience programs, linguistic programs, or initial teaching alphabet materials.

Sex Differences in Primary-Grade Achievement

The design of the study made possible a comparison of sex differences in readiness for reading as well as in first-grade and second-grade reading and spelling achievement. Results indicated a general superiority for girls at all three testing points. The implication is obvious. Primary-grade teachers will have to hold different expectations concerning the reading achievement of boys and girls. On the average, boys cannot be expected to achieve at the same level as girls under current methods of instruction. Similarly the typical boy (if indeed there is such a creature) can be expected to be less ready for reading instruction than the typical girl when he enters the first grade. It is also interesting to note that sex differences in achievement do not appear to be related to any special method of teaching reading. On the average, girls achieve at a higher level no matter what approach to beginning reading is used.

An examination of the types of tests on which sex differences are found yields some interesting information. Girls are superior

to boys on all reading readiness tasks except the orally-presented test of general understanding vocabulary. At the end of the first grade girls are superior to boys on all achievement measures except for the orally-presented test of vocabulary. At the end of grade two a similar trend is evident. Girls are superior in spelling ability, word recognition ability, reading comprehension, language skills, and word study skills. Boys, however, are superior on the orally-presented test of science and social science concepts. A definite pattern exists. Girls are much better than boys in performance on tasks involving visual perception and/or reading-related tasks. Boys hold their own when the task does not involve either of these two components. It is apparent, therefore, that the average boy will experience difficulty in reading and reading-related tasks. It is also apparent that the typical boy will experience difficulty with primary-grade group tests of intelligence which may involve a great deal of visual perception, a considerable amount of reading, or both. Perhaps a better estimate of intelligence, particularly for boys, would be an orally-administered test of general understanding vocabulary. This implication may be especially crucial because of the importance attached to intelligence test scores in planning instruction for pupils in many of today's schools.

Instructional Methodology in Initial Instruction

A major purpose of the Cooperative Research Program was to evaluate a number of beginning reading programs, many of which had been published and/or implemented in the past few years. Among the

programs evaluated were conventional basal readers, phonics-emphasis instructional systems, "linguistic" materials, initial teaching alphabet materials, and language experience approaches. The relative effectiveness of each of the innovative materials and programs was evaluated by comparing pupil achievement in these programs with the achievement of pupils who learned to read by means of well-known conventional basal readers.

A number of conclusions seem warranted by the data. In the first place, instruction in phonics appears to be highly related to word recognition and spelling achievement in the primary grades. This finding is true for a wide variety of techniques for teaching sound-symbol relationships. Apparently, phonics can be taught successfully by inductive means, by deductive methods, by so-called synthetic phonics programs, and by analytic phonics systems. There is some indication that the method by which phonics is taught may not be as important as the fact that direct attention is given to helping the pupil learn sound-symbol relationships.

It is impossible at this point, of course, to assess the long-range effect of concentrated phonics instruction on reading ability. The possibility exists that emphasizing phonics in the initial stages of reading instruction has only a transitory effect on word recognition skills. It may even be that heavy phonics emphasis has a detrimental effect on reading fluency and comprehension in later years. Nevertheless, there is a strong indication that early instruction in phonics is related to early success in word

recognition and spelling.

A related conclusion is that various kinds of control of sound-symbol correspondences help the child to recognize more words at an earlier stage. The initial teaching alphabet controls sound-symbol relationships by introducing what approaches a phonemic alphabet, one in which one graphemic symbol is related to one functional sound in a language. Certain "linguistic" materials control sound-symbol correspondences by introducing initially only regularly-represented words. Each of these systems of vocabulary control appears to facilitate acquisition of skill in unlocking words and in spelling. Therefore, some control of vocabulary in beginning materials according to sound-symbol correspondences is likely to be helpful.

Teachers should likewise make note of the fact that direct instruction in comprehension is apparently essential even in beginning materials. The superiority of various phonics-emphasis programs in terms of pupil achievement in word recognition and spelling was not demonstrated, as a general rule, in the area of reading comprehension. The assumption can be made that the ability to recognize words does not transfer automatically to the ability to comprehend the meaning of sentences and paragraphs. This finding does not support the contention that the pupil's only task in learning to read is to develop the ability to translate graphemic symbols into their oral counterparts on the premise that once he has decoded the words the child will under-

stand their meaning. Instructional materials should be developed with the teaching of comprehension as one of the goals of the program. Furthermore, teachers must impress upon the young reader that reading involves considerably more than mere decoding.

There is also evidence that a writing component is an effective addition to a primary reading program. Among the more successful programs were those which asked the pupil to learn to write the graphemic symbol as a means of learning to recognize it. It is likely that writing symbols in connection with phonics instruction is helpful in aiding the pupil to learn sound-symbol correspondences. Furthermore, writing irregularly-represented words such as "the" and "of" is probably helpful in committing such high frequency structure words to the "sight" vocabulary.

A related implication to those presented above is that early attention be given to teaching the beginning reader or, perhaps in most cases the prereader to recognize the letters of the alphabet. Knowledge of letters and the ease with which a pupil learns to recognize letters are predictive of the facility with which the child will learn to read. The ability to recognize and name the letters is likewise a prerequisite for phonics instruction. Therefore, teachers will likely find it useful to teach letter knowledge during kindergarten or in the early stages of the first grade.

It is also apparent from this study that expectations of pupil accomplishment in initial reading instruction can be raised. Primary pupils can learn to recognize considerably greater numbers

of words than are commonly introduced in reading programs. This is especially true if initial vocabulary is controlled on the basis of sound-symbol regularity. Of course, the question of whether or not beginning readers should learn more words is still open to debate. Longitudinal studies may yet show the importance of introducing vocabulary slowly and of repeating words often. Evidence available at this point is insufficient to test the contention of many reading authorities that early concentrated emphasis on phonics and rapid pacing of vocabulary have a deleterious effect on reading fluency and comprehension in later grades. The advantage of introducing vocabulary more rapidly and of accelerating the introduction of phonics skills is that it enables the pupil to become an independent reader at an earlier age. Additional longitudinal information is necessary to evaluate the long-range consequences of these instructional procedures.

A Closing Statement

Although I have pointed out some elements of instructional methodology which appear to be related to pupil achievement in primary reading, the implication remains that the teacher and/or the entire instructional setting are the key elements in determining whether or not a child learns to read and the extent to which he achieves skill in this most important task. The study provides strong evidence that the project (in most cases a school system) is more influential in determining the average reading achievement of pupils than is the particular set of materials which are used

in the instructional program. The extensive range in achievement among classrooms within any method points out the importance of elements in the learning situation over and above the materials employed. The elements of the learning situation attributable to teachers, classrooms, schools, and school systems obviously play a large role. Much of this variability is undoubtedly a reflection of teacher differences. At any rate, it is likely that improvement in reading instruction can be brought about more efficiently by improved selection and training of teachers, by improved in-service training programs, and by improved school learning climates than by instituting changes in instructional materials. Our next task, therefore, is a highly complex one. We must identify those characteristics of teachers which differentiate the "good" teacher from the "poor" teacher. We must then either select for the teaching profession individuals who already possess these characteristics or set up a program to help the teacher or potential teacher to acquire them. We must also identify those characteristics which differentiate the "good" school system from the "poor" or "mediocre" one and then help each system to acquire these positive components. It appears that we have our work cut out for ourselves. It is not necessary to start from scratch, however. The Cooperative Research Program in First-Grade Reading Instruction, as well as many other investigations which have preceded it, have provided some insights into the realm of initial reading instruction from which to build future research endeavors.

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